

CLAIMS

The invention is claimed as follows:

1. An air-vented closure assembly for a fluid container comprising:
 - a body having a docking member for connecting the closure to the container, the body having a first conduit and a second conduit, the first conduit is adapted for conveying liquid and has a liquid outlet, the second conduit is adapted for conveying air and has an air inlet; and
 - a member having opposed first and second ends with a liquid outlet at the first end and an air inlet at the second end, the member positionable with respect to the body from a closed position where no liquid flows through the first conduit to an open position where liquid can flow through the first conduit.
2. The closure of claim 1 wherein the first conduit extends in a first direction parallel to the second conduit.
3. The closure of claim 2 wherein the member has a valve element mounted for reciprocating movement in a second direction.
4. The closure of claim 3 wherein the second direction is transverse to the first direction.
5. The closure of claim 4 wherein the valve element has an axis and is moveable upon rotation of the valve element about the axis.
6. The closure of claim 5 wherein the valve element has a generally cylindrically shaped side wall.
7. The closure of claim 6 wherein the cylindrically shaped side wall defines a third conduit having a first end and a second end and having a second air inlet proximate the first end.
8. The closure of claim 7 wherein the cylindrically shaped side wall has a top wall having a portion removed to define the second air inlet.

9. The closure of claim 8 wherein the second air inlet is essentially centrally disposed on the top wall.

10. The closure of claim 7 wherein the cylindrically shaped wall has a continuous top wall and has a portion removed from the cylindrical side wall proximate the top wall.

11. The closure of claim 7 wherein the second end of the cylindrical wall has a reduced diameter portion.

12. The closure of claim 7 wherein the body has a mounting sleeve and the cylindrically shaped side wall is positioned in the mounting sleeve.

13. The closure of claim 12 wherein the mounting sleeve has a spirally extending groove and the cylindrically shaped wall has a peg fitting into the groove so that rotation of the wall causes movement of the wall along the axis.

14. The closure of claim 13 wherein the wall blocks the flow of liquid from the liquid outlet when the member is in the closed position.

15. The closure of claim 14 wherein in the open position the second air inlet is in alignment with the first air inlet and the wall does not block the liquid outlet.

16. The closure of claim 3 wherein the member comprises a valve stem and a valve element.

17. The closure of claim 16 wherein the valve stem has opposed first and second ends having the valve element connected to the second end.

18. The closure of claim 17 wherein the valve stem extends axially through the cylindrical body.

19. The closure of claim 18 wherein the member is biased in a closed position.

20. The closure of claim 18 further comprising an activator for moving the member from a closed position to an open position.

21. The closure of claim 20 wherein the activator is a push button.

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22. The closure of claim 21 wherein the push button is an elastomeric material.
23. The closure of claim 22 wherein the push button biases the member in the closed position.
24. The closure of claim 23 wherein the push button is connected to the valve stem.
25. The closure of claim 24 wherein the cylindrically shaped side wall has a top opening and the push button seals the top opening.
26. The closure of claim 25 wherein the cylindrically shaped side wall defines a third conduit having a first end and a second end having a second air inlet proximate the first end.
27. The closure of claim 26 further comprising a device for alternately sealing and opening the second air inlet.
28. An air-vented closure assembly comprising:
 - a valve body having a first fluid conduit and a second fluid conduit spaced from the first conduit, and a mounting sleeve in fluid communication with the fist fluid conduit and the second fluid conduit, the mounting sleeve having an axis therethrough;
 - a valve member positioned in the mounting sleeve for reciprocating movement therein from a closed position to an open position in response to rotation of the valve member about the axis, the valve member having a wall having a first end and an opposed second end, the valve member having a third fluid conduit therethrough, a first portion of the wall of the valve member is removed to define an air inlet into the third fluid conduit and a second portion is removed to define an air outlet from the third conduit, and
 - wherein when the valve member is in the closed position a portion of the valve member blocks fluid flow through the first conduit and a portion of the mounting sleeve blocks air flow from the air outlet, and when in the open position fluid can flow through the first conduit and air can flow through the air outlet.

29. The assembly of claim 28 wherein the first fluid conduit extends parallel to the second fluid conduit.

30. The assembly of claim 29 wherein the first fluid conduit and the second fluid conduit extend in a direction substantially perpendicular to the axis.

31. The assembly of claim 30 wherein the mounting sleeve has a substantially cylindrical wall.

32. The assembly of claim 31 wherein a portion of the wall of the mounting sleeve is removed to define a first spirally extending groove.

33. The assembly of claim 32 wherein the mounting sleeve wall has a thickness and an interior surface and wherein the groove extends through a portion of the thickness.

34. The assembly of claim 33 wherein the groove extends through less than 98% of the thickness of the sleeve wall.

35. The assembly of claim 34 wherein the groove extends through the entire thickness of the sleeve wall.

36. The assembly of claim 35 wherein the valve body has a first peg extending from the wall and is mounted in the first groove.

37. The assembly of claim 35 further comprising a second spirally extending groove on the sleeve circumferentially spaced from the first groove and a second peg on the wall is mounted in the second groove.

38. The assembly of claim 36 wherein when the valve body is in the closed position the first peg is positioned at a first end of the first groove and when the valve body is in the open position the first peg is in the second end of the first groove.

39. The assembly of claim 38 wherein the first groove has a protuberance proximate the first end which engages the first peg when the valve body is in the closed position.

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40. The assembly of claim 33 wherein the spout has an inner surface having a first taper portion defining a first reduced inner diameter portion.

41. The assembly of claim 40 wherein the valve body has an outer surface having a second taper portion defining a second reduced outer diameter portion, the second taper portion being concentrically positioned within the first taper portion when the valve body is in the closed position.

42. The assembly of claim 28 wherein the air outlet has a shape selected from the group consisting of circular, semi-circular, oval, polygonal, irregular or amorphous

43. The assembly of claim 42 wherein the air outlet comprises a plurality of sub-outlets.

44. The assembly of claim 43 wherein each of the sub-outlets have a shape selected from the group consisting of circular, semi-circular, oval, polygonal, irregular or amorphous.

45. The assembly of claim 43 wherein the sub-outlet is circular.

46. The assembly of claim 44 wherein the sub-outlets form a pattern.

47. The assembly of claim 46 wherein the pattern is selected from the group consisting of circular, semi-circular, oval, polygonal, irregular or amorphous.

48. The assembly of claim 46 wherein the pattern is a triangle.

49. The assembly of claim 48 wherein the triangle is an equilateral triangle.